
**Canadian Intellectual
Property Office**
Strategis
[Help](#) [What's New](#) [Site Map](#) [Feedback](#) [About Us](#) [Français](#)
[GO TO](#) [Main Menu](#)
[Licenses, Legislation and Regulations](#)
[Search](#) [Strategis](#)
[CIPO
Home Page](#)
Canadian Patent Database
[Patents Data
Home Page](#)

06/27/2000 - 20:23:24

[Search Foreign
Patents](#)

(12) Patent Application:

(11) CA 2233097

[Trade-marks
Database](#)

(54) PEANUT BUTTER AND JELLY FOOD SLICE

[Search
Options](#)

(54) TRANCHE DE GELEE ET DE BEURRE D'ARACHIDES

- [Basic](#)
- [Number](#)
- [Boolean](#)
- [Advanced](#)

[View or Download Images](#)
[Guided
Tour](#)
(72) [Inventors](#) (Country): CHENN, Fletcher (United States)
[Help](#)
(73) [Owners](#) (Country): CHENN, Fletcher (United States)(71) [Applicants](#) (Country): CHENN, Fletcher (United States)(74) [Agent](#): RIDOUT & MAYBEE

- [Content](#)
- [Searching](#)
- [Search
Language](#)
- [FAQ](#)

(45) [Issued on](#):(22) [Filed on](#): Mar. 23, 1998(43) [Laid open on](#): Sep. 26, 1998(51) [International Class \(IPC\)](#): A23L 1/06; A23P 1/08; A23L 1/38
[Disclaimer](#)
[Patent Cooperation Treaty \(PCT\)](#): No
(30) [Application priority data](#):

Application No.	Country	Date
60/042,402	United States	Mar. 26, 1997

[Availability of licence](#): N/A

[Language of filing](#): English

ABSTRACT:

A non-spread, sliced peanut butter and jelly slice containing jelly that is completely surrounded by peanut butter. The peanut butter and jelly slice, when placed in a sandwich will exhibit the same textures, flavors and qualities of a peanut butter and jelly sandwich that is made by hand. The final product may be packaged in non-stick wrap, sealed and frozen to keep fresh and allow the product to maintain its form. A method for making the

OPIC

OFFICE DE LA PROPRIÉTÉ
INTELLECTUELLE DU CANADA

CIPO

CANADIAN INTELLECTUAL
PROPERTY OFFICE(12) (19) (CA) **Demande-Application**(21) (A1) **2,233,097**

(22) 1998/03/23

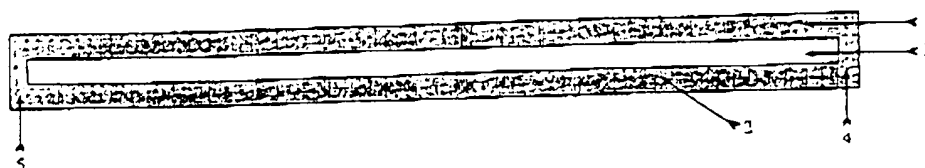
(43) 1998/09/26

(72) CHENN, Fletcher, US

(71) CHENN, Fletcher, US

(51) Int. Cl.⁶ A23L 1/38, A23P 1/08, A23L 1/06

(30) 1997/03/26 (60/042,402) US

(54) **TRANCHE DE GELEE ET DE BEURRE D'ARACHIDES**(54) **PEANUT BUTTER AND JELLY FOOD SLICE**

(57) Tranche de gelée et de beurre d'arachides qui ne s'étale pas. La gelée est entièrement entourée par le beurre d'arachides. Lorsqu'elle est placée dans un sandwich, la tranche de gelée et de beurre d'arachides conservera les mêmes goût, texture et qualités d'un sandwich à la gelée et au beurre d'arachides fait à la main. Le produit final peut être enveloppé dans un emballage non collant, scellé et congelé afin d'en conserver la fraîcheur et la forme. Une méthode de préparation de la tranche de gelée et de beurre d'arachides qui ne s'étale pas est également dévoilée.

(57) A non-spread, sliced peanut butter and jelly slice containing jelly that is completely surrounded by peanut butter. The peanut butter and jelly slice, when placed in a sandwich will exhibit the same textures, flavors and qualities of a peanut butter and jelly sandwich that is made by hand. The final product may be packaged in non-stick wrap, sealed and frozen to keep fresh and allow the product to maintain its form. A method for making the non-spread, peanut butter and jelly slice is also disclosed.



ABSTRACT

A non-spread, sliced peanut butter and jelly slice containing jelly that is completely surrounded by peanut butter. The peanut butter and jelly slice, when placed in a sandwich will exhibit the same textures, flavors and qualities of a peanut butter and jelly sandwich that is made by hand. The final product may be packaged in non-stick wrap, sealed and frozen to keep fresh and allow the product to maintain its form. A method for making the non-spread, peanut butter and jelly slice is also disclosed.

PEANUT BUTTER AND JELLY FOOD SLICE

FIELD OF THE INVENTION

This invention pertains to a peanut butter and jelly food item and a method of preparing it.

BACKGROUND

Peanut butter and jelly has been a staple food item for generations. Over the years, considerable efforts have been devoted to improving traditional peanut butter and/or jelly. For example, Bogdan in U.S. Patent No. 5,567,454 described a peanut butter and jelly food item in which a central layer of peanut butter is encapsulated by jelly. This item is apparently of the jelly roll-up variety in which the jelly is firm yet flexible. Castillo, Jr. (U.S. Pat. No. 5,312,641) and Ayres et al. (U.S. Pat. No. 3,772,038) disclosed peanut butter slices that may be packed in wax paper and are reported to eliminate the need for spreading peanut butter. Numerous patents have described layered or swirled peanut butter and jelly compositions, including: Newlin et al. (U.S. Pat. No. 3,615,591), Colby et al. (U.S. Pat. No. 3,278,314), Tiemstra (U.S. Pat. No. 3,969,514), Lloyd et al. (U.S. Pat. No. 5,034,242), and Bundus (U.S. Pat. No. 3,582,358).

Despite these numerous attempts, there remains a need for a peanut butter and jelly product that retains the goodness, texture and ingredients of traditional peanut butter and jelly, but in a more convenient and less messy form.

SUMMARY OF THE INVENTION

The present invention provides a peanut butter and jelly slice in which outer two layers and a side wall made of peanut butter that totally surround an inner jelly layer. The present invention further provides a method for preparing the peanut butter and jelly slices which includes steps of depositing two layers of peanut butter and a center jelly layer and shaping the peanut butter to form sidewalls around the jelly layer to form a three-layer peanut butter and jelly slice in which the jelly layer is completely surrounded by peanut butter.

The peanut butter and jelly slices of the present invention are designed to facilitate the preparation of peanut butter and jelly sandwiches. Each peanut butter and jelly slice may be individually wrapped in a non-stick wrap such as wax paper and frozen. When frozen, the individual ingredients will not solidify into a sheet of ice, but will remain flexible and edible even without being thawed. If eaten immediately after taken out of the freezer, the peanut butter and jelly slice will exhibit a cool and refreshing quality yet still maintain all the fine qualities of the individual ingredients, such as the rich peanutty flavor combined with the sweetness of jelly or jam. The present invention can be placed on other food such as crackers or a slice of bread or used to create other food items such as by placing it between two pieces of bread to form a sandwich.

An advantage of this product is the ease and speed at which a peanut butter and jelly sandwich can be made. When a peanut butter and jelly sandwich is made in a kitchen by spreading the peanut butter and jelly on bread with a knife it can often be quite messy. When the peanut butter is spread, the bread is often damaged due to the thickness of the peanut butter. When the jelly is spread, the bread often becomes soggy when it absorbs the jelly. The latter problem is most evident when the sandwich has had time to sit in a child's lunch box for a few hours. The present invention solves this problem by sealing the jelly layer in between two outer layers of peanut butter. Furthermore, since the peanut butter is not spread onto the bread, the bread does not get damaged. Therefore, when a peanut butter and jelly slice is placed between two pieces of bread, each piece of bread only comes in contact with the outer layers of peanut butter. The jelly does not make the bread soggy and the bread does not get ripped by a knife since there is no spreading required. Preparation time is also drastically reduced and children can make this product without the danger of being cut since knives are not necessary.

By freezing the peanut butter and jelly slice, the slice can easily be removed from its wrapping with minimal tackiness. Furthermore, keeping the peanut butter and jelly slice in a freezer maintains its freshness and allows for a more natural product without additional preservatives which would be needed to keep the

product fresh at room temperature. In addition, freezing the peanut butter and jelly slice prevents the discoloration of the peanut butter and jelly which is so common in products which package layers of peanut butter and jelly together in a single jar. The individual slices will also provide a precise measurement of the ingredients, so that people with dietary concerns will be able to gauge the exact amount of peanut butter and jelly they are consuming.

BRIEF DESCRIPTION OF THE DRAWINGS

The drawings illustrate various aspects of preferred aspects of the invention. While the drawings show clear demarcated lines, the actual final products may not necessarily have such clean, straight lines.

Figure 1 is a cross sectional view of the presently preferred embodiment of a peanut butter and jelly slice of the present invention.

Figure 2 is a top down view of the jelly layer 6 as it is placed on the first peanut butter layer 7.

Figure 3 is a three-dimensional sectional view of the jelly layer 6 as it is placed on the first peanut butter layer 7.

Figure 4 is a cross-sectional view of a mold 10 for preparing the peanut butter and jelly slice as described in Example 2, and containing the first layer of peanut butter 11.

Figure 5a is a cross sectional view of the mold 10 for preparing the peanut butter and jelly slice as described in Example 2. A second mold insert 12 holds the middle layer of jelly 13. The jelly layer 11 is also visible.

Figure 5b is a top down view of Figure 5a.

Figure 6 is a cross sectional view of the mold for preparing the peanut butter and jelly slice as described in Example 2. A second layer of peanut butter 13 lies on top of the other two layers. The peanut butter side walls 12a seal and encase the middle jelly layer 13.

Figure 7 is a top down view of a 12" x 14" tray with a first layer of peanut butter 15 spread on it.

Figure 8 is a top down view of a 12" x 14" tray with the form mold 16 placed on top to hold the second layer of jelly 17 for each peanut butter and jelly slice. This drawing shows how the middle layer of jelly is placed for preparation of sixteen (16) peanut butter and jelly slices as described in Example 3.

Figure 9 is a top sectional view of a 12" x 14" tray with the top layer of peanut butter spread on it. This drawing shows how the second layer of peanut butter is placed for preparation of sixteen (16) peanut butter and jelly slices as described in Example 3. Each 3" x 3.5" section 19 is a single peanut butter and jelly slice. The entire tray contains sixteen of these slices 19.

DETAILED DESCRIPTION OF THE PRESENTLY PREFERRED EMBODIMENT OF THIS INVENTION

In describing the details for making the present invention, it is important to understand that the terms "peanut butter" and "jelly" are not intended to be limited to the exact technical definition of the terms. Instead, the term "peanut butter" should be understood to include other forms of nut butter which are made from nuts other than peanuts as well as various forms of nut butter, i.e. crunchy (chunky) or smooth nut butter. Also, the term "jelly" should be understood to encompass a sweet product such as jams, jellies, marmalades and preservatives. Preferably, the jelly has the consistency of the type traditionally enjoyed in peanut butter and jelly sandwiches, and is preferably not the firm, cohesive type that is used in fruit roll-ups. The peanut butter and jelly slice may also include other flavors and ingredients which will be incorporated in one or several of the individual layers of peanut butter and jelly. These flavors and ingredients include, but are not limited to chocolate, marshmallows and fruit and may be similar in concept to flavored ice cream.

The slices and layers of the present invention may be described in dimensional terms. The length and breadth of the layers is shown in the top down views in the Figures. The thickness is shown in the cross-sectional views. Preferably, each layer has a thickness between about 0.1 to 1 centimeter (cm); more preferably, between about 0.2 to about 0.7 cm. Also, preferably, each layer

has a length and a breadth of between about 3 to about 15 cm, more preferably about 5 to about 12 cm, and most preferably, about the size of a bread slice - about 7 to about 10 cm (about 3 to about 4 inches). The peanut butter side walls are preferably about 0.3 to about 1.2 cm (about 1/8 to 3/4 inch) wide (i.e. the dimension shown in the top down views); more preferably about 0.6 cm (about 1/4 inch). The peanut butter layers have greater length and breadth than the jelly layer (which is reduced in size by the width of the side walls), and the layers generally have a flat shape (although, in some embodiments, the peanut butter layers may be compressed near the edges to form the sidewalls that surround and seal the jelly layer). The flat shape is shown by the layers having greater length and breadth than thickness; for example the length and/or breadth of the layers is preferably is at least five times greater than their thickness. The peanut butter layers must have length and breadth dimensions that are at least coextensive with the jelly layer and are preferably larger, i.e. the length and breadth of the peanut butter layers are typically larger than the jelly layer due to the width of the side walls. The peanut butter layers are continuous layers, and, although it is less preferable, the jelly layer can be replaced with a discontinuous layer while still obtaining the advantage of completely surrounded jelly in a non-spread, peanut butter and jelly slice.

Example 1

The examples may be better understood by reference to the drawings.

Figure 1 shows a peanut butter and jelly slice. In this cross sectional view of a peanut butter and jelly slice, a layer of jelly 3 is surrounded and sealed between a bottom layer of peanut butter 2 and a top layer of peanut butter 1.

Each of the two layers of peanut butter 1 and 2, and the middle layer of jelly 3 are proportioned to be two-parts peanut butter and one-part jelly. In addition, the middle layer of jelly 3 is also surrounded by peanut butter 4 and 5 which is approximately 1/4 inch (0.6 cm) in width.

To prepare a peanut butter and jelly slice the bottom layer of peanut butter 2 is first prepared by spreading approximately 0.75 ounces (21 grams) of peanut butter onto a piece of wax paper and shaping it into a square the size of a slice of white bread. This is the first peanut butter layer and it should measure out to roughly 3 x 3.5 inches (7.6 x 8.9 cm) in dimension and 1/8th inches (0.3 cm) high. Next, approximately 0.5 ounces (14 gm) of jelly are spread on top of the first peanut butter layer 7 and made in a square dimension. The jelly layer 3 should be spread to within 1/4 of an inch (0.6 cm) from the edges of the peanut butter layer. Figure 2 shows a top view of the jelly layer 6 as it appears when placed on top of the first peanut butter layer 7. Figure 3 shows a three-dimensional view of the

same step, with the jelly layer 8 being placed on top of the first peanut butter layer 9.

On a second sheet of wax paper, another 0.75 ounces (21 g) of peanut butter are spread flat in the same exact dimensions as the first peanut butter layer 3. Once the second layer of peanut butter 1 is finished, it is placed, peanut butter side down, on top of the other two layers 2 and 3. A sheet metal die is placed on top of all three layers to seal the peanut butter together. When the top layer of peanut butter 1 is placed on top, the two side walls of peanut butter 4 and 5 will be formed. These two walls will help surround and seal the jelly layer inside the peanut butter and jelly slice.

When all layers are together, they form a peanut butter and jelly slice. The completed peanut butter and jelly slice may now be frozen for a minimum of four (4) hours or until it reaches its desired temperature and/or consistency.

Note that it is anticipated that the peanut butter and jelly slices will be made on a mass production basis with commercially available equipment. The freezing or cooling processes mentioned in the examples set forth a basic method of freezing. Other methods and equipment are available to freeze or cool the food product and these can be used to achieve the desired results.

When finished, the peanut butter and jelly slice is wrapped and sealed in non-stick wrap. The freezing of the peanut butter and jelly slice not only helps

keep the ingredients fresh, but also keeps the form and shape of the slice and allows for easy removal from the non-stick wrap and also prevents discoloration in the peanut butter from the jelly. Each peanut butter and jelly slice is individually wrapped and sealed in non-stick wrap and is roughly the same thickness as two to three slices of individually wrapped cheese.

Example 2

In this example, 0.75 ounces (21 g) of peanut butter is heated until it liquefies so that it can be poured. In some cases other methods for liquefying peanut butter or jelly can be substituted for heating; for example, some materials are thixotropic and can be liquefied under applied strain. Figure 4 shows a cross sectional view of a mold 10 after the melted peanut butter 11 is poured into it. This layer of peanut butter 11 should be 1/8th inch (0.3 cm) high and approximately the same dimensions as a piece of bread (3" x 3.5").

Once the peanut butter layer 11 has cooled (either by freezing or other process), a second mold 12 is placed on top of it. This mold 12 will have no bottom and have walls approximately 1/4 inch (0.6 cm) in width. It will be used to make the middle layer of jelly and ensure that the jelly layer maintains a square shape approximately 1/4 inches (0.6 cm) smaller in breadth and length as peanut butter layer 11 (i.e. 2.75" x 3.25").

Approximately 0.5 ounces (14 g) of jelly are heated until it liquefies so that it can be poured. Once the jelly is ready, it is poured (or extruded) into the mold 12 and left to cool. When this jelly layer 13 is cooled and/or frozen, the mold 12 can be removed. The jelly layer 13 will form the middle layer of jelly. Figure 5 also shows a top-down view of the jelly layer 13 in its mold 12.

The top layer of peanut butter is made by heating another 0.75 ounces (21 g) of peanut butter. While the peanut butter is being heated, the mold 12 which was used to make the jelly layer 13 can be removed. Figure 6 shows the top peanut butter layer after is poured on top of the first two layers. The top layer of peanut butter 14 will seal the jelly layer 13 inside the two peanut butter layers 11 and 14. The peanut butter that is poured to form the top peanut butter layer 14 will form the side walls of peanut butter 12a which help to surround and encase the jelly layer 13.

The entire product should then be cooled and frozen as described at the end of Example 1. Each individual peanut butter and jelly slice is then wrapped and sealed in non-stick wrap and stored in a freezer.

Example 3

In another example of making the present invention, 12 ounces (340g) of peanut butter is heated until it liquefies so that it can be poured onto a 12" by 14" baking tray. Once the peanut butter is poured and evenly distributed over the tray,

it should be cooled. This will form the first layer of peanut butter 15 as shown in Figure 7.

Eight (8) ounces (220g) of jelly are heated until it liquefies so that it can be poured. Once the peanut butter has been cooled and/or frozen, place a mold 16 on top of the first peanut butter layer 15 and pour 0.5 ounces (14g) of jelly into each hole of the mold. Each of these jelly sections will form the middle layer of jelly 17 of the peanut butter and jelly slice. Jelly layer 17 is cooled and the mold 16 is removed. Figure 8 shows the mold 16 with the jelly 17 already poured into each section. Each square of jelly is 0.5 inches (1.3 cm) apart from each other. This 0.5 inch gap will accommodate the 1/4 inch (0.6 cm) overlap of the peanut butter layers over the jelly layer.

After the jelly has been cooled and/or frozen and the mold 16 has been removed, the final layer of peanut butter can be prepared. This is done by heating 12 ounces (340g) of peanut butter until it liquefies so that it can be poured. The peanut butter is then poured on top of the middle jelly layer 17 and first peanut butter layer 15. The entire tray may then be placed in the freezer and chilled for a minimum of 4 hours.

Next, the peanut butter and jelly slices can be divided into individual slices by cutting them as shown in Figure 9. Each individual peanut butter and jelly slice 19 is then wrapped and sealed in non-stick wrap and stored in a freezer.

Example 4

Another example of making the invention utilizes a commercial process similar to the one utilized in the mass production of cheese slices (i.e. individually wrapped American cheese slices). Such a process may resemble an assembly line with each layer of peanut butter and jelly being separately poured or injected onto a conveyor belt system.

The process would involve the heating of a large quantity of peanut butter until it liquefies so that it can be poured, and then injecting it into the mold or pan. The peanut butter would be poured out in a continuous strip approximately 3 inches (7.6 cm) in width. The width of this strip corresponds to the width of one peanut butter and jelly slice. The mold or pan can also be placed on a conveyor belt apparatus which would hold the molten peanut butter as it comes out of the machine.

The peanut butter layer would then be rapidly cooled until it is frozen. The freezing process can be expedited with equipment readily available on the market. The freezing process is discussed in Example 1.

Jelly would then be heated until it liquefies so that it can be poured and injected on top of the first frozen layer of peanut butter. The jelly would be injected from the machine at a width of 2.75 inches (7.0 cm) and a length of 3.25 inches (8.2 cm). Each section of jelly would be separated by 0.5 inches (1.3 cm)

so that when each slice is cut, the peanut butter layers will overlap the jelly layers by a 1/4 inch (0.6 cm).

The peanut butter layer with the jelly layer on top would then be rapidly cooled until it is frozen.

The process used to make the first layer of peanut butter is again repeated, but this time the peanut butter is injected on top of the first layer of peanut butter and the middle layer of jelly which have already been made. The three layers together are then rapidly cooled until frozen as described above and in Example 1.

While the product is still frozen, it is cut into squares approximately 3.0" x 3.5", and then packaged in the same method as the cheese slices in waxed coated packaging wrap. The product is then kept frozen until the consumer uses the peanut butter and jelly slice.

Although the invention has been described in conjunction with specific embodiments, it should be understood that various alternatives will be apparent in light of the foregoing description. For example, some jellies have sufficiently low viscosity that they can be poured or extruded without heating, thus avoiding the heating step in Example 2. Accordingly, the invention is not limited by the embodiments but includes the equivalents that fall within the spirit and scope of the appended claims.

WHAT IS CLAIMED:

1. A non-spread, peanut butter and jelly slice comprising:

a bottom layer of peanut butter;

a middle layer of jelly disposed over, and in contact with, said bottom layer;

a top layer of peanut butter disposed over, and in contact with, said middle layer of jelly;

wherein each of said bottom, middle and top layers have dimensions of length, breadth and thickness and each of said layers have top and bottom surfaces with dimensions of length and breadth;

wherein the layers have dimensions of length and breadth such that said top and bottom layers of peanut butter are at least coextensive with said middle layer of jelly;

wherein the outermost extent of the length and breadth dimensions of the jelly layer form the periphery of the jelly layer; and

a side wall of peanut butter along the periphery of the jelly layer such that the jelly layer is completely surrounded by peanut butter.

2. The non-spread, peanut butter and jelly slice of claim 1 wherein said jelly is not a cohesive, firm jelly.

3. The non-spread, peanut butter and jelly slice of claim 2 wherein the slice is packaged in a non-stick wrap.
4. A package containing a stack of the non-spread, peanut butter and jelly slices of claim 3, in a frozen condition.
5. The non-spread, peanut butter and jelly slice of claim 2 consisting of said bottom, middle and top layers.
6. A sandwich in which the slice of claim 1 is disposed between two slices of bread.
7. The non-spread, peanut butter and jelly slice of claim 1 wherein said length and breadth are the same, resulting in a square shaped slice.
8. The non-spread, peanut butter and jelly slice of claim 1 wherein each layer has a length and a breadth of about 5 to about 12 cm, and a thickness of about 0.2 to about 0.7 cm.
9. The non-spread, peanut butter and jelly slice of claim 8 wherein the side walls have a width of about 0.3 to about 1.2 cm.
10. A method of making a peanut butter and jelly slice in which the jelly is completely surrounded by peanut butter, comprising the steps of:
disposing a first peanut butter layer having dimensions of length and breadth;

depositing a layer of jelly on the first peanut butter layer, wherein said jelly layer has dimensions of length and breadth that are less than those of the first peanut butter layer;

depositing a second layer of peanut butter on the jelly layer, wherein said second peanut butter layer has dimensions of length and breadth that are the same as the first layer; and

shaping at least one peanut butter layer to form side walls that completely surround the jelly layer.

11. The method of claim 10 wherein said second layer of peanut butter is deposited in the molten state and flows around the edges of the jelly layer to form said side walls; wherein said shaping step occurs as part of said step of depositing a second layer of peanut butter.

12. The method of claim 10 wherein the shaping step comprises pressing the edges of the peanut butter slices.

13. The method of claim 10 wherein, after said step of disposing the first peanut butter layer but before said step of depositing the jelly, a mold is placed on said first peanut butter layer to prevent jelly from flowing to the edges of said first peanut butter layer;

wherein said jelly is deposited by pouring or extruding;
cooling the jelly layer to increase its viscosity; and

removing said mold before said step of depositing a second layer of peanut butter.

14. The method of claim 13 wherein the peanut butter is heated and poured or extruded into a mold to form said first peanut butter layer.

15. The method of claim 10 wherein multiple slices are prepared in a single tray;

wherein said first peanut butter layer is disposed in a tray;
a grid shaped mold is placed on said first peanut butter layer before depositing the jelly layer; and

removing said grid shaped mold after said step of depositing a layer of jelly but before said step of depositing a second layer of peanut butter.

16. The method of claim 10 wherein all of the steps are performed on a conveyor belt.

17. The method of claim 16 further comprising the step of wrapping each slice in a non-stick wrap, and then freezing the wrapped slice to put it into a frozen condition.

18. A method of making a sandwich comprising disposing upon a slice of bread a peanut butter and jelly slice prepared in accordance with the method of claim 10, wherein the length and breadth dimensions of the slice of bread are at least as great, respectively, as the length and breadth dimensions of the peanut butter and

jelly slice to be disposed wholly upon the slice of bread, and disposing a second such slice of bread above the peanut butter and jelly slice.

Ridout & Maybee
Suite 2400
One Queen Street East
Toronto, Canada M5C 3B1
Patent Agents of the Applicant

Figure 1.

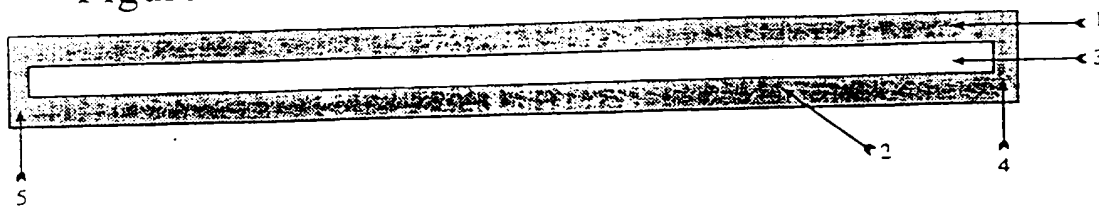


Figure 2.

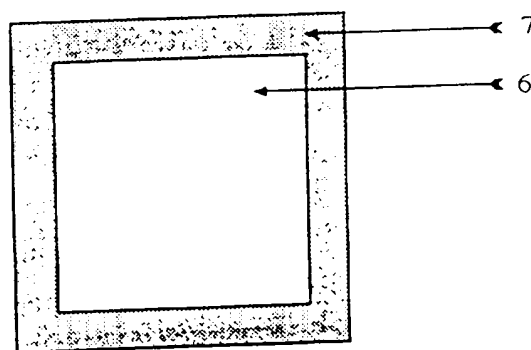


Figure 3.

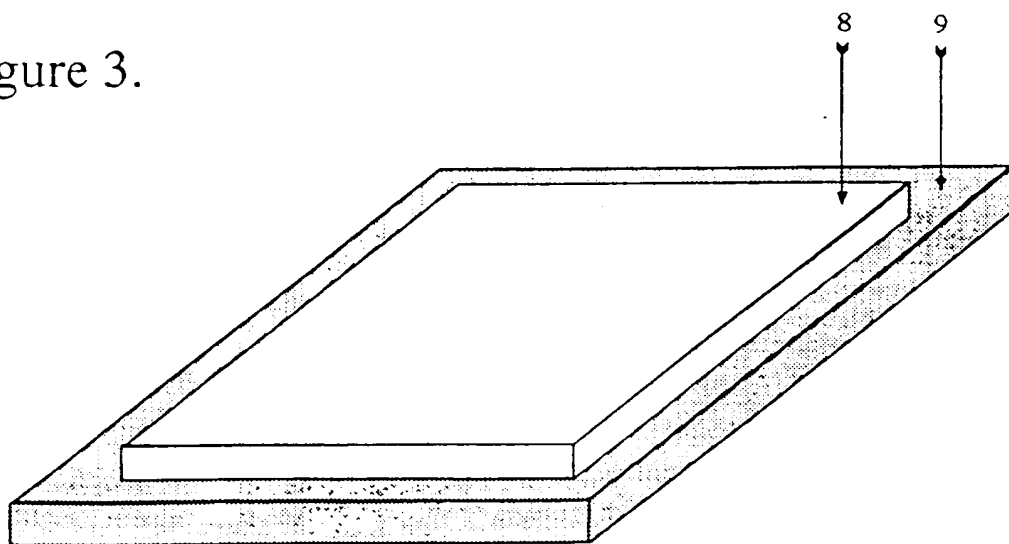


Figure 4.



Figure 5a.

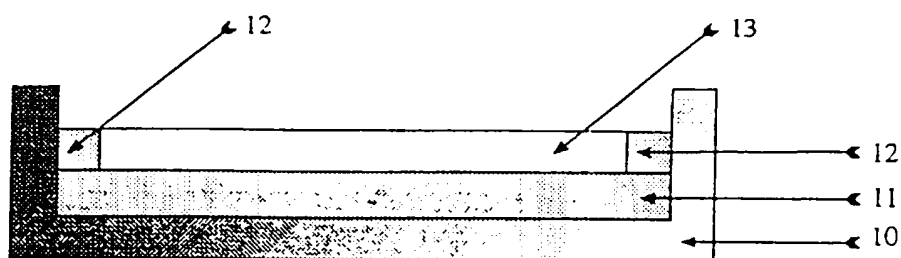


Figure 5b.

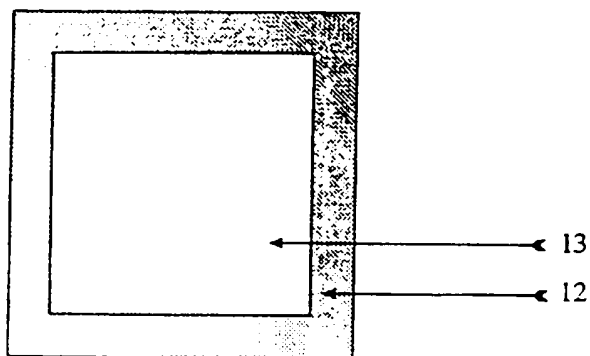


Figure 6.

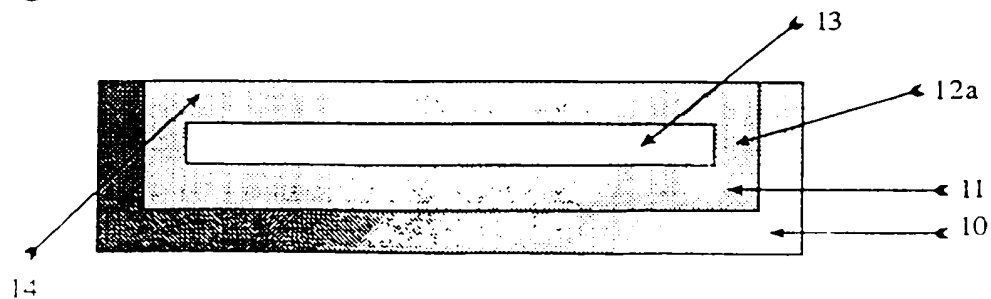


Figure 7.

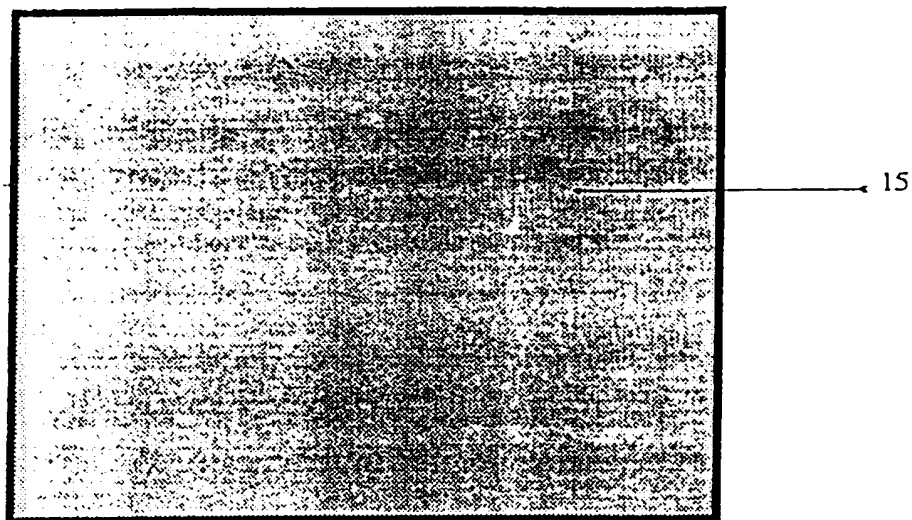


Figure 8.

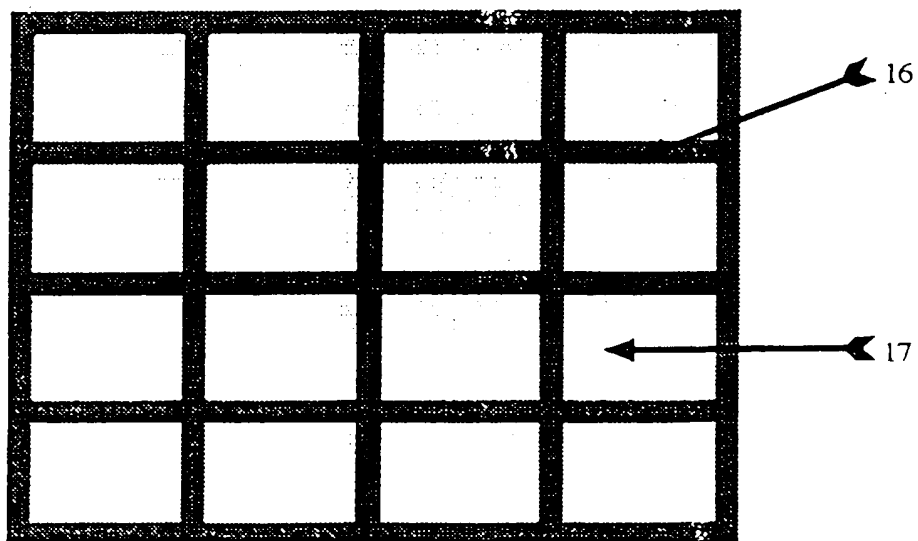


Figure 9.

